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# Didcot Garden Town Housing Infrastructure Fund (HIF1) Scheme Wide

Preliminary Lighting & Electrical Design Report

Project number: 60632497

September 2021

## Quality information

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## Revision History

Revision	Revision date	Details	Authorized	Name	Position
P01	19/08/2021	Draft for comment	Y	AGB	Project Manager
P02	20/09/2021	Updated	Y	AGB	Project Manager

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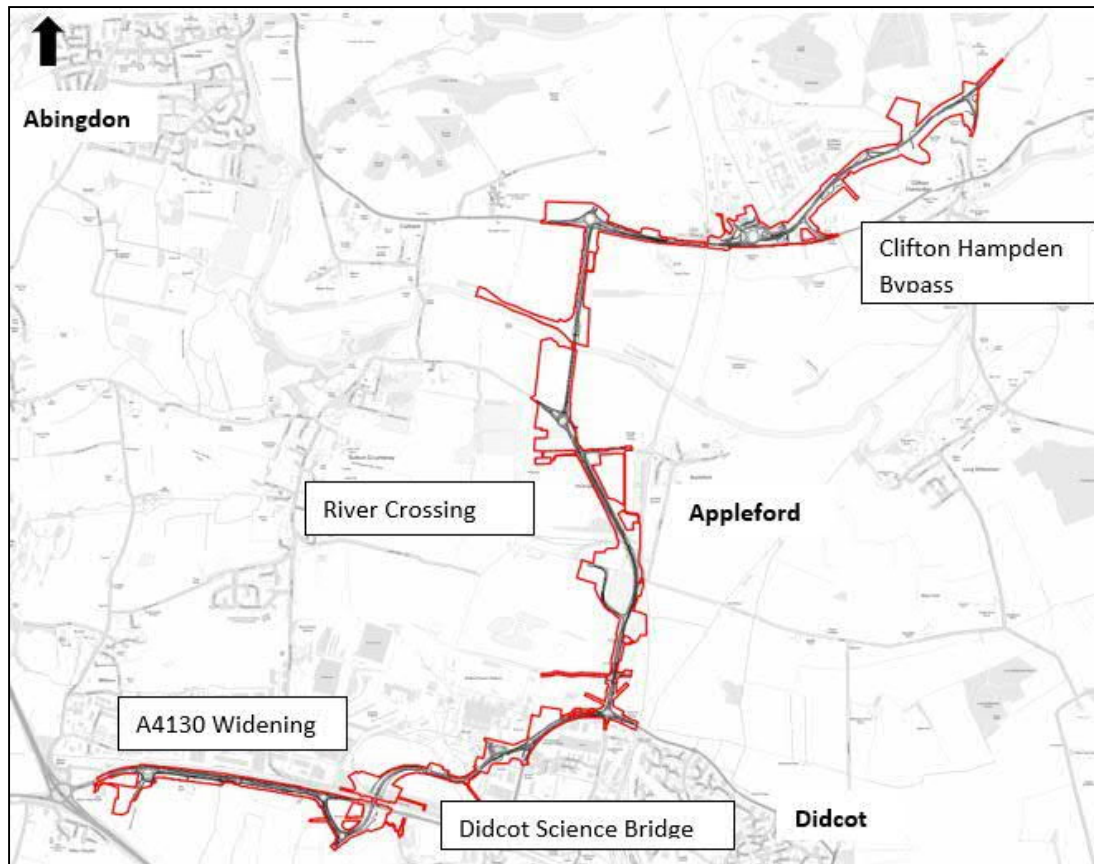
## 1. Introduction

- 1.1 AECOM have been commissioned by Oxfordshire County Council (OCC) to carry out a preliminary lighting and electrical design for the Didcot Garden Town Housing Infrastructure Fund (HIF1), hereafter referred to as the 'Scheme'.
- 1.2 The Scheme consists of four sections that make up the overall Scheme package, including the improvement of the existing A4130 road and the development of three new roads. Although separate sections, they must be delivered cohesively for their benefits to be fully realised. The four sections of the Scheme include:
  - A4130 Widening – the dualling of the A4130 carriageway with segregated walking and cycling facilities from the Milton Gate Junction eastwards including the construction of three roundabouts.
  - Didcot Science Bridge – a new single carriageway road bridge with segregated walking and cycling facilities over the A4130, the Great Western Mainline and Milton Road and link road through the former Didcot A Power Station connecting back into the A4130 (Northern Perimeter Road) north of Purchas Road roundabout.
  - Didcot to Culham River Crossing – construction of a new single carriageway with segregated walking and cycling facilities road between Didcot and Culham including the construction of three roundabouts, a road bridge over the Appleford railway sidings and road bridge over the River Thames.
  - Clifton Hampden Bypass – construction of a single carriageway new road between the A415 and B4015 with segregated and shared pedestrian and cycling facilities including the provision of one roundabout and associated junctions.

The route covers a mix of existing roads and privately owned fields, and Land in the parishes of Milton, Didcot, Harwell, Sutton Courtenay, Appleford-on-Thames, Culham and Clifton Hampden. Currently all of the affected parishes are lit by street lighting columns operated and maintained by OCC. The Scheme crosses through areas of proposed development, including the former Didcot A Power Station. Access is required to enable the construction of these developments. The road corridor will also include cycle and footway facilities alongside it, as well as several formal controlled crossing points.

The proposed extents of the Scheme are shown in Figure 1.

**Figure 1 Scheme Extents**



This report details the lighting and electrical design proposals along with any additional considerations that have been included as part of the design process.

## 2. Existing Equipment

There is existing lighting located within several sections along the scheme extents. Existing lighting inventory has been provided by OCC Lighting Team. This has been used to inform the design together with observations made on some of the existing lighting from a ground level column door off site survey conducted by AECOM lighting team on 10 September 2020.

### 2.1 Street lighting

#### 2.1.1 A4130 Widening

Along the A4130 and at the Milton Interchange and junction with Milton Gate, the existing street lighting uses Urbis Sapphire lanterns with SON (high pressure sodium) lamps (see figure 2). East of the junction with Milton Gate, the carriageway lighting transitions to tubular steel columns with post top mounted DW Windsor Kirium Pro LED luminaires (see figure 3). These columns were installed as part of the upgrade works for Backhill Tunnel in 2019 and no inventory information has been provided for this equipment.



**Figure 2 Side entry mounted Urbis Sapphire on 15m Octagonal tapered column**



**Figure 3 Post top mounted LED Kirium Pro luminaire on tubular steel column**

The lighting along this section of the A4130 is setback behind the footpath in grass verge.

#### 2.1.2 Didcot Science Bridge

Along the A4130 and the roundabout with Purchas Road and Hawksworth the majority of the existing street lighting is either old SOX (low pressure sodium) shown in figure 4 below or SON (high pressure sodium). Based on the visual survey, the exceptions to this were 2 No lighting columns which had newer Holophane Vmax and ASD Diamond LED luminaires (ASD shown in figure 5).





**Figure 4 Side entry mounted SOX luminaire**



**Figure 5 Side entry mounted LED ASD luminaire**

The lighting on the A4130 is all side entry mounted on outreach brackets and is set back in grassed verge areas behind the Northbound carriageway (see figure 6). At the Purchas Road roundabout lighting is located on the footpaths only and not on the roundabout splitter islands.



**Figure 6 Street lighting arrangement on the A4130**

### **2.1.3 Didcot to Culham River Crossing**

Along the A4130 (West of Collett) and the roundabout with Collett, most of the existing street lighting is either older SOX (low pressure sodium) or SON (high pressure sodium) which is shown in figure 7. Along the A4130 (East of Collett) the lighting is a mixture of ASD Diamond LED luminaires

(see figure 8) and older SOX luminaires. The street lighting within the scheme extents on Collett all uses ASD LED Diamond luminaires.



**Figure 7 Side entry mounted SOX luminaire** **Figure 8 Side entry mounted LED ASD luminaire**

The lighting on the A4130 is all side entry mounted on outreach brackets and is set back in grassed verge areas behind the Northbound carriageway. On the A4130 east of the Collett roundabout, the lighting is located behind Vehicle Restraint System (VRS) (see figure 9). At the Collett roundabout, the lighting is located on the footpaths only and not on the roundabout splitter islands.



**Figure 9 Street lighting arrangement behind VRS on the A4130 (East of Collett RBT)**



## 2.1.4 Clifton Hampden Bypass

Along Station Road and A415 Abingdon Road the existing street lighting consists of Urbis Sapphire Lanterns utilising SON (high pressure sodium) shown below in figure 10 & 11.



**Figure 10 Post top mounted Urbis Sapphire lantern**



**Figure 11 Side entry mounted Urbis Sapphire lantern**

The lighting on Station Road and the A415 is a mixture of post top mounted (5m) columns and side entry mounted octagonal (10m) columns with extension bracket and are set back in grassed verge areas behind the footpaths.

In addition to the highway lighting, there are also Urbis Axia LED luminaires on the Culham Centre access road and the associated footpaths see figures 12 & 13 but this is not OCC equipment.



**Figure 12 Post top mounted Urbis Axia LED lantern** **Figure 13 Post top mounted Urbis Axia LED lantern**

## 2.2 Existing Electrical

Most of the lighting columns are DNO (Distribution Network Operator) supplied (some could not be confirmed). However, the DNO supply connection was loop-in-loop-out instead of the more widely used direct connection to the DNO isolators. Most of the lighting columns within the scheme extents did not have any secondary isolator units and luminaires were supplied directly from the DNO cut-out. Whilst this approach does not contravene British Standard and is still quite common practice, it is no longer employed by OCC (see OCC HSD 1400 – 005). In a few locations (such as Backhill Tunnel) lighting columns are supplied via a Private Cable Network (PCN) from a DNO supplied feeder pillar. Most of the illuminated signs and bollards throughout the scheme extents are PCN supplied from nearby lighting columns with a few exceptions being direct DNO supplied.

## 3. Proposed Lighting Design

### 3.1 Scheme Wide

The lighting classes for all applicable areas in the Scheme have been provided by OCC lighting and are listed below in Table 1.

**Table 1 Lighting classes provided by OCC**

Area	Lighting Class			
	A4130 Widening	Didcot Science Bridge	Didcot to Culham River Crossing	Clifton Hampden Bypass
Carriageway	M4/C4	M3/C3	M4/C4	M4/C4
Junction / Crossing Conflict Area	C3 / C4	C2	C3 / C4	C3 / C4
Footpath	P3	P4	P3	P3
Cycle path	P3	P3	P3	P3

The 5 second rule of lighting for conflict areas outlined by ILP PLG 02: The Application of Conflict Areas on the Highway has been utilised to define the extents for the conflict area lighting design. Where suitable, the extents of lighting have been taken to a point where road alignment changes do not require the removal of the existing lighting on site.

For the carriageway extents, the target lighting M class is as shown in Table 1. The 'M' lighting classes are 'luminance' requirements and for these to be accurately calculated the column spacings and arrangement need to be consistent. Due to the nature of the scheme extents with crossings, the lighting proposals here instead use 'illumination' calculations and have been designed to the comparable 'C' lighting class. The performance requirements for lighting C classes used for the scheme are detailed below in Table 2.

**Table 2 C class Performance Requirements**

Lighting Class	Horizontal Illuminance	
	E in Lux (minimum maintained)	U <sub>0</sub> (minimum)
C2	20	0.4
C3	15	0.4
C4	10	0.4

In liaison with the OCC HIF1 team it was agreed that the Non-Motorised Users (NMU) cycle path provisions will be lit to lighting class P3. These provisions will be lit for the entirety of the Scheme with the exception of sections of the River Crossing structure, Appleford Sidings Bridge and the Didcot Science Bridge even through the carriageway, other than at junctions, will be otherwise unlit. These NMU cycle paths are to be lit to encourage their use as they are expected to be key commuter routes.

Lighting performance requirements for P3 and P4 are detailed below in Table 3.

Sections of footpath that are within areas of proposed carriageway lighting will be calculated to show the expected lux levels achieved. Remote sections of footpath without associated cycleway will be lit to P3 or P4 depending on the location (as shown in Table 1)

**Table 3 P class Performance Requirements**

Lighting Class	Horizontal Illuminance (lux)	
	E Ave	E Min
P3	7.50 – 11.25	1.50
P4	5.0-7.50	1.0

*As per BS EN 13201-2:2015*

## 3.2 A4130 Widening

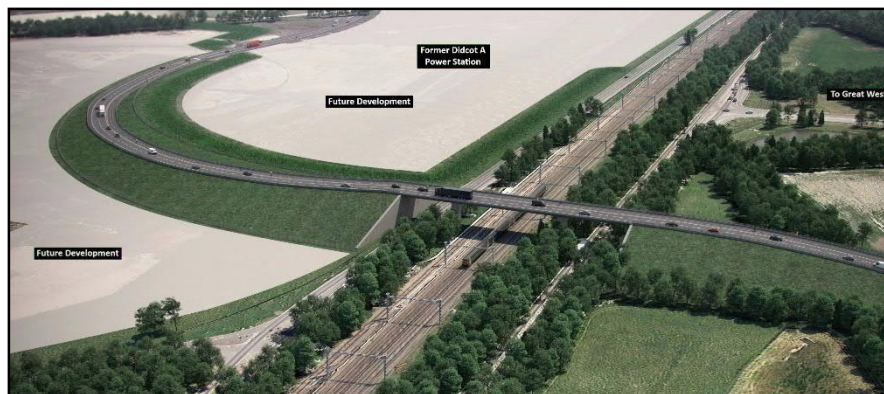
The areas within the scheme extents for the new proposed carriageway are mainly subject to 40mph with only the Didcot Science Bridge roundabout having a speed limit of 30mph.

There are two sections of the scheme where the junctions are close enough together to mean that it is impractical to leave these sections unlit; Milton Gate to Backhill Roundabout and the Old A4130 (Northern) Roundabout to Didcot Science Bridge Roundabout. The former would be a section of 40m, so it has been lit to conflict area class of C3. The latter is approximately 100m so has been lit to the carriageway class of M4/C4.

## 3.3 Didcot Science Bridge

The road across the Didcot Science Bridge scheme will be subject to a 30mph speed limit, except the far eastern section, where it connects back into the existing A4130, which will have a 50mph speed limit.

Lighting for NMUs is being proposed on the bridge approaches and onto the structure. However, lighting equipment will not be positioned over Network Rail land so as to minimise the risk of glare to train drivers. The carriageway is not being lit on the bridge approach embankments or the Didcot Science Bridge structure. The cycleways are designed to lighting class P3.



**Figure 14 Visualisation of the proposed Didcot Science Bridge**

Between the proposed northern bridge approach and the Moor Ditch culvert, the lighting designs are being undertaken by OCC on behalf of the consultant BWB Consulting LTD for Clowes Development (Former Didcot A Power Station). The understanding is that these designs provide lighting for the access to the new development. Contact has been established between AECOM, BWB and OCC Lighting Team where it has been agreed that BWB will tie-in their lighting design proposals with the AECOM lighting design.

The proposed shared use path to the South-East of the old A4130 junction has not been included in the conflict area extents as it is remote and located behind a grassed verge. As a result, this area has been calculated separately to ensure it achieves the minimum required lighting class for a cycleway of

P3. The same lighting class is achieved on the proposed segregated footway and cycleway that runs parallel to the north of the realigned A4130.

The existing lighting on site (along the Northern Perimeter Road) is all being upgraded as part of a 1-for-1 lantern renewal scheme being carried out by OCC lighting. Therefore, the AECOM lighting design proposals for DSB incorporate tie in points with the new upgraded luminaires.

### **3.4 Didcot to Culham River Crossing**

Most of the scheme extents for the new proposed carriageway are subject to 50mph speed limit with small sections of 30mph. The only areas where the 5 second rule has not been implemented is where design areas have been extended to include pedestrian crossing points, so as not to leave short sections of unlit highway.

The older SOX existing lighting on site is all being upgraded as part of a 1-for-1 lantern renewal scheme being carried out by OCC lighting. Therefore, AECOM lighting design proposals for the RIV scheme incorporate tie in points with the upgraded existing column position located on the A4130.

### **3.5 Clifton Hampden Bypass**

The areas within the scheme extents for the new proposed carriageway which are to be lit, are subject to 40mph.

OCC lighting has requested that the access roads around Culham Station be lit to lighting class P3. In addition, after discussion with the client the direction was given that the T junction of the A415 and the B4015 will not be lit.

## 4. Proposed Lighting Equipment

### 4.1 Luminaires

The information and standard detail provided by OCC lighting gives details on acceptable lighting equipment that can be used. This includes details on approved luminaire types of which the DW Windsor Kirium is one.

To provide a flexible lighting design with minimal proposed column quantities, a variety of output and optic variations of the DW Windsor Kirium Pro 2 luminaire have been proposed in the designs. OCC do not specify a glare limitation on their street lighting lanterns. However, to provide balance between equipment quantity and potential light spill G3 rated Kirium Pro Mini lanterns have been used on all sections of cycleway/ footway where there is no other lighting proposed.

Compliant Lighting designs have been undertaken for all sections as per the requirements of Table 1 in section 3.1 and the results are contained in Appendix A and B of this report.

### 4.2 Columns & Mounting

All columns are to be finished in Reed Green RAL 6013, as specified by OCC.

Footpath/ cycleway proposed luminaires throughout the scheme will be post top mounted on 5m Raise and Lower 'Style 2' lighting columns. Please refer to OCC HSD 1300 – 007 for further detail.

In certain locations the proposed luminaires will be post top mounted on 6m 'Style 2' lighting columns for pedestrian crossings located away from junctions and sections of access road. Please refer to OCC HSD 1300 – 006 for further detail.

All other proposed luminaires are to be side entry mounted with 0.75m outreach brackets on 10m Valmont Stainton Avon octagonal conical tapered lighting columns. All bracket arms are to have 5° uplift, as a result the luminaire should be installed with -5° inclination resulting in an overall lantern tilt of 0°.

Please refer to OCC HSD 1300 – 021 for further detail.

#### 4.2.1 Didcot Science Bridge

Due to the lighting requirement for columns on the bridge structure a non-standard column will be required. These will be 5m flange plated Valmont Stainton Avon conical tapered lighting columns mounted on blisters set on the side of the bridge.

#### 4.2.2 Didcot to Culham River Crossing

Due to the lighting requirement for columns on the bridge structure a non-standard column will be required. This will be a 10m flange plated Valmont Stainton Avon conical tapered lighting column mounted on a blister set on the side of the bridge.

### 4.3 Control & Switching Strategies

All luminaires are to be fitted with 7 Pin NEMA with Westire 7200 series photocell with a switching setting of 35/18 as agreed with OCC lighting. Luminaires shall be dimmed to 75% output between the hours of 00:00 and 06:00



## 5. Proposed Electrical

Electrical proposals have been made with consideration for existing low voltage (LV) network availability together with supply requirements for any illuminated street furniture.

### 5.1 Distribution Network Operator (DNO) Connections

OCC lighting have expressed their preference for the proposed electrical supplies to be made via DNO connections. The proposed design utilises the existing supply arrangement on site which is a DNO connection to the LV network. There are no columns proposed to be supplied via private cable networks (PCN), except those to be mounted on the bridge structures. If existing column positions are required to be relocated through changes of highway alignment, these new columns may either be a new DNO supply connection or a DNO transfer of service if the relocation is within 2m.

All proposed columns within the scheme extents shall have new secondary termination units installed.

### 5.2 Private Low Voltage Network Connections

Any proposed illuminated street furniture located in the footway is proposed to be privately electrically supplied from nearby lighting columns. The extent of this work and detail of the units will be confirmed at subsequent design stages.

## 6. Design Considerations

Whilst lighting is required along the footpath/ cycleway section where it is remote from the junctions it has been kept to the lowest practicable level along with the use of lower mounting heights (5m). By taking into account the remote location and ecological considerations in the area, a G3 glare rated luminaire has been proposed to maximise the spacings of columns and reduce the overall energy and maintenance requirements of the scheme. A 34m single sided spacing is achievable within these constraints. These columns are located at the back of the footway wherever possible in order to provide sufficient clearance from NMUs. Along the A4130 due to the location of the NMU the lighting has been located between the cycleway and carriageway directing the light away from the carriageway.

There is proposed vehicle restraint barrier through much of the scheme and in many locations is also located at the back of path. As the final location of this barrier is not yet agreed additional co-ordination of the lighting columns will be required at a later design stage to ensure required clearances are achieved.

Where luminaires are located, if the light spill is deemed significant then louvres and shields can subsequently be fitted to luminaires to mitigate against this. However, this will need to be balanced with the requirement to achieve compliant light levels over the site.

All proposed luminaires utilise a correlated colour temperature (CCT) of 3000K. Although, warmer colour temperatures for LED light sources generally have a reduced light level output when compared to the 4000k model, they are more environmentally friendly and suited to areas with bat flight paths.

As agreed with OCC lighting, the lighting will be dimmed to 75% output between the hours of 00:00 and 06:00. This method of dimming not only reduces energy consumption but can further mitigate potential light intrusion.

### 6.1 A4130 Widening

As most of the A4130 widening site passes over existing highway there are limited environmental considerations or ecological constraints. There is one section of bat activity along a hedgerow by the Meadow Lane track (parallel to Meadow Brook) that intersects with the proposed link between the Old A4130 (Northern) Roundabout and the Didcot Science Bridge Roundabout. This area also has several trees that would be suitable as bat roosts. Whilst this section of highway is being lit, the lighting is provided to the lowest practicable level and it is likely that some of the hedgerow and trees will require removal due to the introduction of the highway itself. Along the segregated footway/ cycleway sections the columns are located between the carriageway and cycleway set back 0.5m from the northern edge of the cycleway.

### 6.2 Didcot Science Bridge

Whilst there are no specific ecological requirements for the Didcot Science Bridge scheme extents, there are however various environmental considerations with regards to the railway and site users. Whilst the NMU provisions are being lit, the main carriageway is not being lit on the bridge approach embankments and the Didcot Science Bridge structure Lighting is to be kept away from the central section and will not be located directly over rail lines or Network Rail land. This should reduce any visual impact of the lighting in the area as well as minimise any light spill on the railway below. Keeping lighting equipment off the central section of the bridge also removes the potential for equipment to fall onto rail lines during maintenance.

### 6.3 Didcot to Culham River Crossing

Much of the Didcot to Culham River Crossing site passes through private fields with various environmental considerations including ecological constraints. There are several areas of quality habitat for bats along with buildings supporting numerous roosts. In addition, there is high bat foraging activity over the large body of water just south of the Appleford Level Crossing.

The extent of lighting at the junction is being kept to a minimum with most of the link sections remaining unlit apart from the required cycleway lighting equipment. Lighting stops just north of the

Sutton Courtenay Roundabout and does not start again until the approach to the Abingdon Roundabout. The bridge crossing over the river is one of the most sensitive area of this section where there has been bat activity monitored along the river. Therefore lighting terminates here with a 10m flange plated Valmont Stainton Avon conical tapered lighting column mounted on a blister set on the side of the bridge and has not been included here for the remaining carriageway or the cycleway / footway.

There are three stand-alone crossings north of the junction with the A4130 that require lighting. Lighting is required here for safety reasons but is kept to the lowest practicable level along with the use of lower mounting heights (6m) and G6 glare rated lanterns to minimise potential spill light. In addition, there is a crossing point south of the Appleford junction on the access road to Appleford itself. The lighting equipment used here is the same type and height (10m) as used elsewhere on the scheme.

## 6.4 Clifton Hampden Bypass

A small amount of the initial section of the Clifton Hampden Bypass passes over existing highway at the A415 but the remaining new highway will run through fields and areas with environmental considerations and some ecological constraints. The northern section of the bypass (east of the T junction with the A415 Abingdon Road) has bat activity. Whilst this section of highway will remain unlit, lighting is required to the shared use path for cyclists and pedestrians throughout this section. Whilst the scheme already utilises 3000k colour temperature lanterns due to the extent of ecological constraint in this section, a warmer white 2700K colour temperature has been proposed.

## Appendix A – Desktop Calculation Report – Area Calculations

### File

### Section

WID_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0001	A4130 Widening – All
DSB_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0003	Didcot Science Bridge – All
RIV_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0001	Didcot to Culham River Crossing – All
CHB_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0001	Clifton Hampden Bypass – A415 Culham RAB
CHB_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0002	Clifton Hampden Bypass – Bus Stop SC
CHB_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0003	Clifton Hampden Bypass – A415 Link
CHB_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0004	Clifton Hampden Bypass – Station Access
CHB_PD_ACM_HLG_SW_LTG_ZZ_ZZ_CA-LE-0005	Clifton Hampden Bypass – Station to SC

**DATE:** 15 June 2021  
**DESIGNER:** AECOM  
**PROJECT No:** 60632497  
**PROJECT NAME:** Didcot HIF 1 - WID



Proposed lighting calculation for Didcot A4130 Widening.

Target lighting classes:  
Conflict Area Class C3  
Carriageway Class M4  
Remote Footway / Cyclepath P3

Maintenance factor:  
DW Windsor Kirium Overall MF = 0.92 (from manufacturer's data)  
(72 month cleaning, zone E3/E4, >6m mounting height)  
  
DW Windsor Kirium Overall MF = 0.84 (from manufacturer's data)  
(72 month cleaning, zone E3/E4, <6m mounting height)

**WID\_PD-ACM-HLG-SW\_LTG\_ZZ\_ZZ-CA-LE-0001**

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## Layout Report

### General Data

Dimensions in Metres Angles in Degrees

### Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1 Backhill Roundabout	448810.12	191327.69	314.03	269.24	1.50	1.50
2	Grid 2 Valley Park Access	449436.89	191307.32	364.85	207.17	1.50	1.50
3	Grid 3 Milton Gate Junctio...	448668.39	191426.25	183.01	124.75	1.49	1.49
4	Grid 4 Northern Roundabout	450080.49	191158.07	255.95	234.31	1.21	1.43
5	Grid 5 Science Bridge Roun...	450193.56	190896.70	310.52	214.55	1.50	1.50
6	Grid 6 Link between Northe...	450165.14	191058.98	203.85	144.87	1.50	1.49
7	Grid 7 Backill RBT Remote ...	448937.10	191392.15	71.91	33.15	1.50	1.44

### Luminaires

#### Luminaire A Data



Supplier	D W Windsor
Type	KIRIUM PRO2 64LED 3k A5 CLO 500mA UM SUG 42 0082 0000 100
Lamp(s)	64 x 3k LED
Lamp Flux (klm)	11.34
File Name	KIRIUM PRO2 64LED 3k A5 CLO_500mA U MSUG 42 0082 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	979.2, 459.0, 0.0
No. in Project	11

#### Luminaire B Data



Supplier	D W Windsor
Type	KIRIUM PRO2 64LED 3k A5 CLO 750mA UM SUG 42 0125 0000 100
Lamp(s)	64 x 3k LED
Lamp Flux (klm)	15.86
File Name	KIRIUM PRO2 64LED 3k A5 CLO_750mA U MSUG 42 0125 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	979.2, 459.0, 0.0
No. in Project	61

#### Luminaire F Data

Supplier	
Type	SPH2/FG/1523/120/-40/993876
Lamp(s)	250W-SONT+
Lamp Flux (klm)	33.20
File Name	Sapphire 2_Flat Glass_1523_SON-T+_250_1 20#-40_993876TY.lid
Maintenance Factor	0.80
Imax70,80,90(cd/klm)	335.5, 27.5, 0.0
No. in Project	3

### Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	B	448888.51	191470.31	10.00	86.00	0.00	0.00	1.25			
2	B	448891.80	191498.85	10.00	263.00	0.00	0.00	1.25			
3	B	448923.14	191452.64	10.00	34.00	0.00	0.00	1.25			
4	B	448926.34	191424.94	10.00	340.00	0.00	0.00	1.25			

**Layout Continued**

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
5	A	448907.21	191374.17	10.00	335.00	0.00	0.00	1.25			
6	B	450300.65	191077.74	10.00	212.00	0.00	0.00	1.25			
7	B	448936.44	191393.04	10.00	145.00	0.00	0.00	1.25			
8	B	448969.41	191422.37	10.00	90.00	0.00	0.00	1.25			
9	B	448992.17	191401.92	10.00	20.00	0.00	0.00	1.25			
10	A	449019.68	191389.64	10.00	203.00	0.00	0.00	1.25			
11	B	449007.26	191431.47	10.00	178.00	0.00	0.00	1.25			
12	B	449017.98	191455.75	10.00	140.00	0.00	0.00	1.25			
13	A	449051.43	191462.21	10.00	90.00	0.00	0.00	1.25			
14	A	449091.26	191460.69	10.00	86.00	0.00	0.00	1.25			
15	A	449092.46	191494.36	10.00	272.00	0.00	0.00	1.25			
16	A	449051.82	191493.59	10.00	277.00	0.00	0.00	1.25			
17	B	449025.05	191499.22	10.00	268.00	0.00	0.00	1.25			
18	B	448999.19	191504.07	10.00	250.00	0.00	0.00	1.25			
19	B	448971.66	191509.67	10.00	270.00	0.00	0.00	1.25			
20	B	448930.60	191503.47	10.00	280.00	0.00	0.00	1.25			
21	B	449009.51	191475.90	10.00	184.00	0.00	0.00	1.25			
22	B	448927.94	191475.76	10.00	344.00	0.00	0.00	1.25			
23	A	448906.94	191340.11	10.00	151.00	0.00	0.00	1.25			
24	B	448847.27	191472.84	10.00	90.00	0.00	0.00	1.25			
25	B	448846.97	191499.99	10.00	270.00	0.00	0.00	1.25			
26	F	448679.64	191458.23	15.00	298.00	0.00	0.00	1.50			
27	B	448737.73	191481.33	10.00	288.00	0.00	0.00	1.25			
28	F	448711.30	191444.69	15.00	114.00	0.00	0.00	1.50			
29	B	448746.52	191457.50	10.00	112.00	0.00	0.00	1.25			
30	B	448795.66	191468.80	10.00	100.00	0.00	0.00	1.25			
31	F	448662.29	191422.24	15.00	118.00	0.00	0.00	1.50			
32	B	449704.35	191416.45	10.00	261.00	0.00	0.00	1.25			
33	B	449699.92	191381.37	10.00	80.00	0.00	0.00	1.25			
34	A	450109.21	191343.30	10.00	257.00	0.00	0.00	1.25			
35	B	450146.49	191328.70	10.00	249.00	0.00	0.00	1.25			
36	B	450181.34	191318.61	10.00	265.00	0.00	0.00	1.25			
37	B	450206.14	191319.54	10.00	276.00	0.00	0.00	1.25			
38	B	450229.22	191310.73	10.00	238.00	0.00	0.00	1.25			
39	B	450255.56	191300.31	10.00	259.00	0.00	0.00	1.25			
40	B	450321.37	191292.80	10.00	266.00	0.00	0.00	1.25			

**Layout Continued**

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
41	B	450284.13	191282.08	10.00	83.00	0.00	0.00	1.25			
42	B	450231.11	191274.58	10.00	142.00	0.00	0.00	1.25			
43	B	450227.59	191247.12	10.00	184.00	0.00	0.00	1.25			
44	B	450238.50	191195.68	10.00	195.00	0.00	0.00	1.25			
45	B	450232.16	191159.30	10.00	22.00	0.00	0.00	1.25			
46	B	450210.55	191216.20	10.00	16.00	0.00	0.00	1.25			
47	B	450195.21	191260.54	10.00	47.00	0.00	0.00	1.25			
48	B	450169.34	191285.05	10.00	53.00	0.00	0.00	1.25			
49	B	450136.45	191301.27	10.00	74.00	0.00	0.00	1.25			
50	A	450101.91	191311.53	10.00	72.00	0.00	0.00	1.25			
51	B	450265.91	191137.28	10.00	198.00	0.00	0.00	1.25			
52	B	450263.95	191099.85	10.00	36.00	0.00	0.00	1.25			
53	B	450295.67	191045.79	10.00	17.00	0.00	0.00	1.25			
54	B	450304.14	191016.60	10.00	8.00	0.00	0.00	1.25			
55	B	450303.94	190986.93	10.00	331.00	0.00	0.00	1.25			
56	A	450276.75	190949.24	10.00	321.00	0.00	0.00	1.25			
57	B	450307.38	190957.03	10.00	139.00	0.00	0.00	1.25			
58	B	450339.11	190983.17	10.00	129.00	0.00	0.00	1.25			
59	B	450364.39	191002.50	10.00	153.00	0.00	0.00	1.25			
60	B	450391.23	191030.28	10.00	124.00	0.00	0.00	1.25			
61	A	450413.29	191055.05	10.00	295.00	0.00	0.00	1.25			
62	B	450363.78	191040.48	10.00	259.00	0.00	0.00	1.25			
63	B	450335.05	191046.75	10.00	259.00	0.00	0.00	1.25			
64	B	448791.94	191494.69	10.00	276.00	0.00	0.00	1.25			
65	B	449588.53	191433.24	10.00	265.00	0.00	0.00	1.25			
66	B	449548.40	191438.70	10.00	263.00	0.00	0.00	1.25			
67	B	449668.66	191425.48	10.00	262.00	0.00	0.00	1.25			
68	B	449623.76	191394.94	10.00	82.00	0.00	0.00	1.25			
69	B	449611.02	191386.86	10.00	173.00	0.00	0.00	1.25			
70	B	449582.66	191399.28	10.00	82.00	0.00	0.00	1.25			
71	B	449508.44	191443.46	10.00	266.00	0.00	0.00	1.25			
72	B	449544.57	191404.45	10.00	87.00	0.00	0.00	1.25			
73	B	449662.49	191389.01	10.00	80.00	0.00	0.00	1.25			
74	B	449628.86	191428.35	10.00	260.00	0.00	0.00	1.25			
75	B	449505.38	191410.41	10.00	81.00	0.00	0.00	1.25			



## Horizontal Illuminance (lux)

Grid 1 Backhill Roundabout



### Results

Eav	15.44
Emin	6.34
Emax	31.44
Emin/Emax	0.20
Emin/Eav	0.41

## Horizontal Illuminance (lux)

Grid 2 Valley Park Access

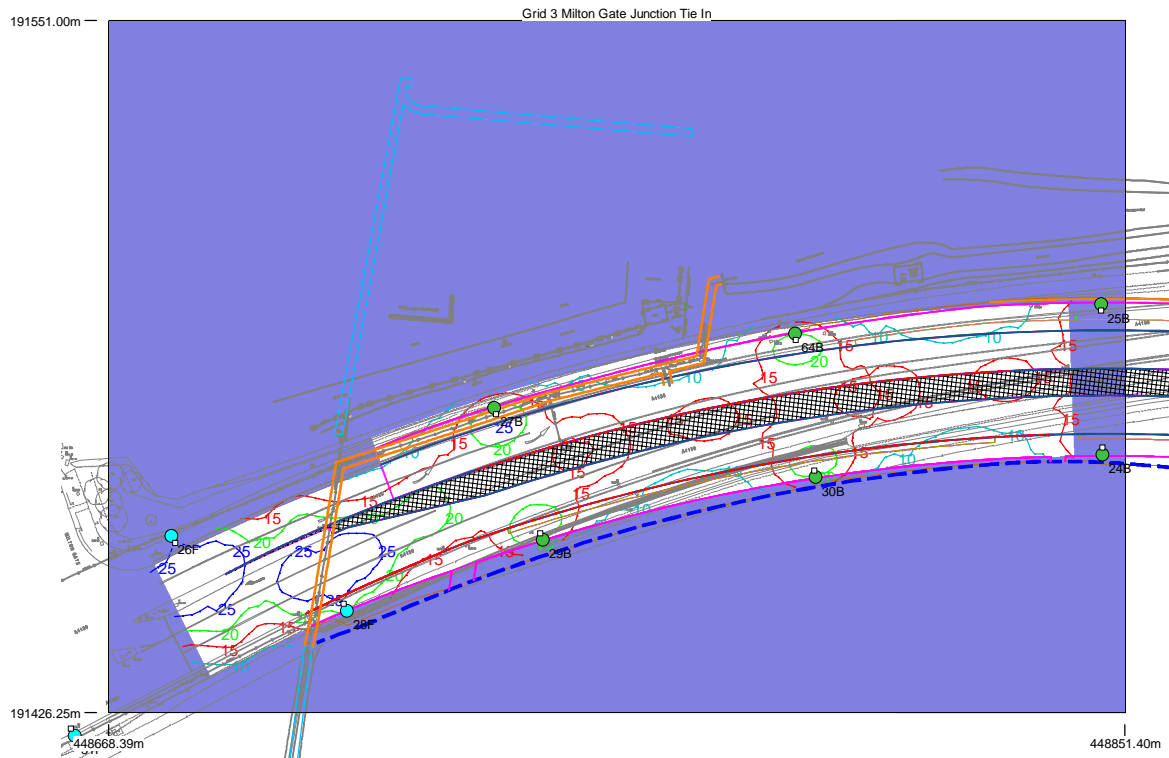


### Results

Eav	15.05
Emin	6.95
Emax	29.06
Emin/Emax	0.24
Emin/Eav	0.46

## Horizontal Illuminance (lux)

Grid 3 Milton Gate Junction Tie In

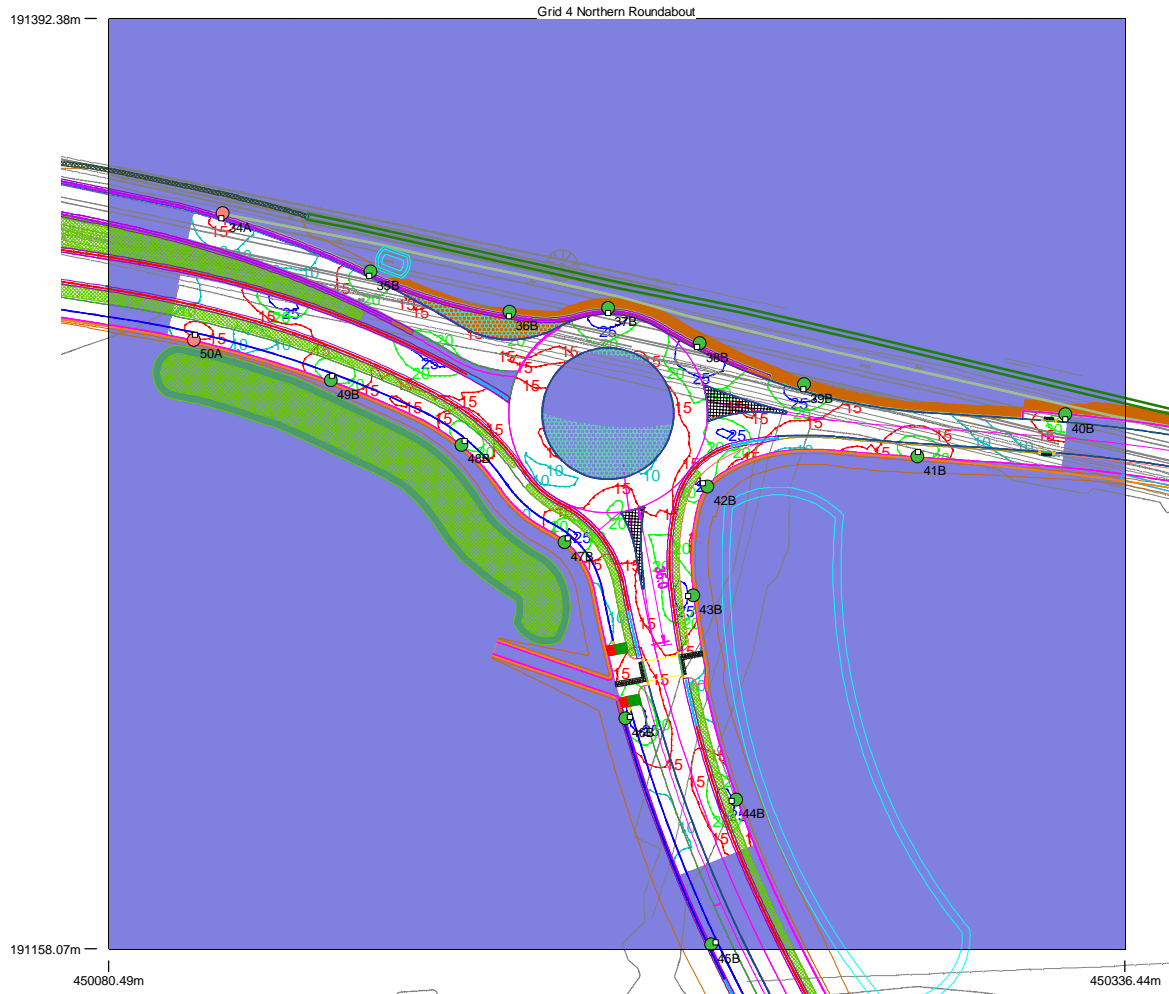


### Results

Eav	15.84
Emin	6.97
Emax	30.94
Emin/Emax	0.23
Emin/Eav	0.44

## Horizontal Illuminance (lux)

Grid 4 Northern Roundabout

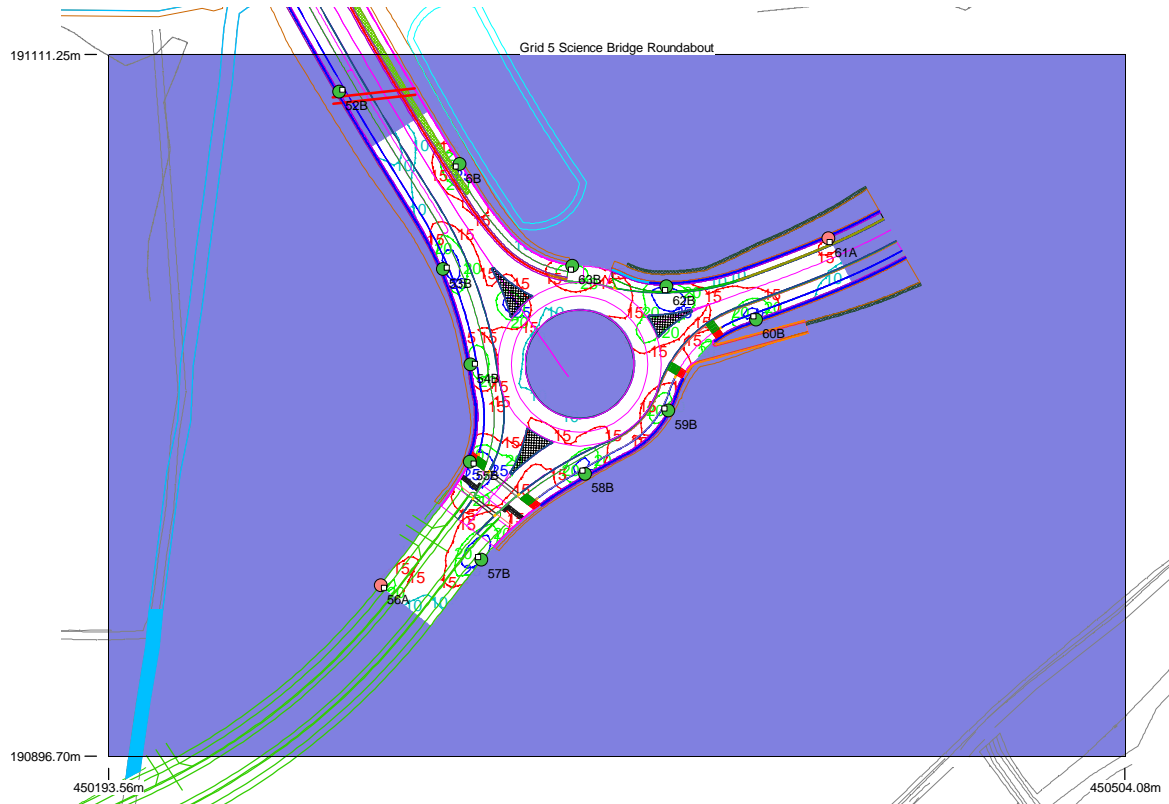


### Results

Eav	15.69
Emin	6.83
E <sub>max</sub>	33.51
Emin/E <sub>max</sub>	0.20
Emin/Eav	0.44

## Horizontal Illuminance (lux)

Grid 5 Science Bridge Roundabout

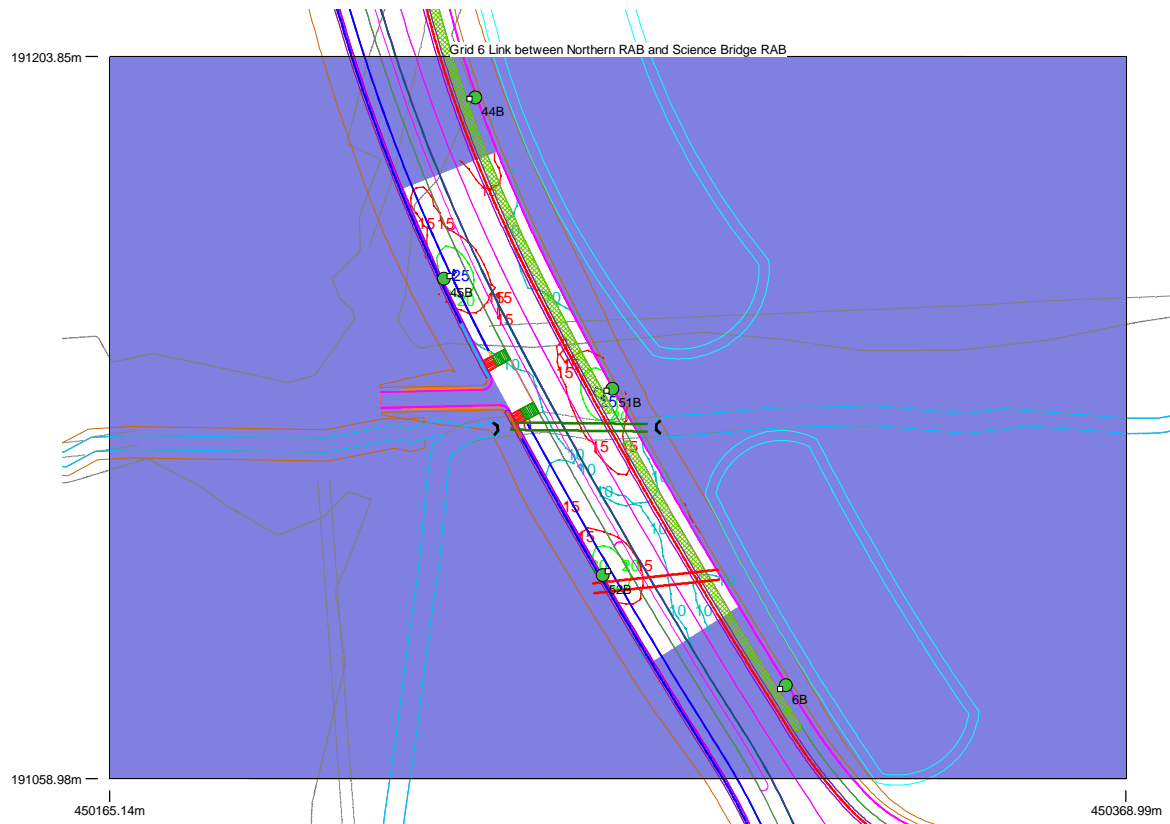


### Results

Eav	15.69
Emin	6.77
Emax	31.39
Emin/Emax	0.22
Emin/Eav	0.43

**Horizontal Illuminance (lux)**

Grid 6 Link between Northern RAB and Science Bridge RAB

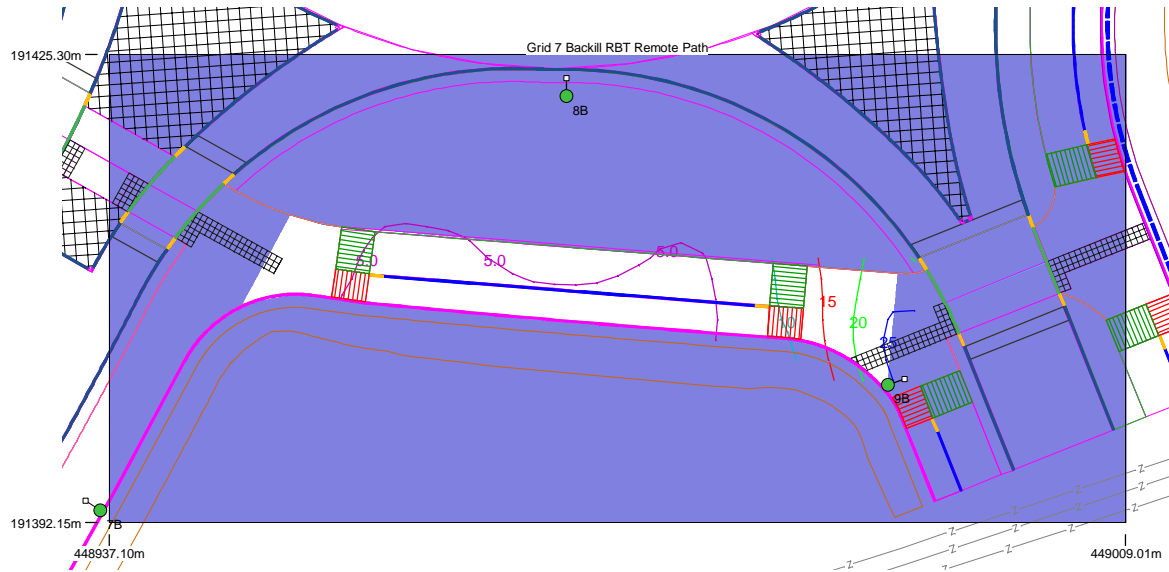


## Results

Eav	13.03
Emin	5.28
Emax	25.41
Emin/Emax	0.21
Emin/Eav	0.41

## Horizontal Illuminance (lux)

Grid 7 Backkill RBT Remote Path



### Results

Eav	7.72
Emin	2.59
E <sub>max</sub>	25.58
E <sub>min</sub> /E <sub>max</sub>	0.10
E <sub>min</sub> /E <sub>av</sub>	0.34

**DATE:** 28 April 2021  
**DESIGNER:** AECOM  
**PROJECT No:** 60606782  
**PROJECT NAME:** Didcot HIF 1 - DSB



Proposed lighting calculation for Didcot Science Bridge.

Target lighting classes:  
Road Class M3/C3  
Conflict Area Class C2

Maintenance factor:  
DW Windsor Kirium Overall MF = 0.92 (from manufacturer's data  
taking into account CLO)  
(72 month cleaning, zone E3/E4, >6m mounting height)

Luminaire D forms part of the proposed S38 Clowes Power Station  
and information taken from OCC drawing: A4896

## **DSB Proposed Lighting Design**

**PREPARED BY:** AECOM Ltd  
Saxon House  
27 Dukes Street  
Chelmsford  
Essex  
CM1 1 HT



## Layout Report

### General Data

Dimensions in Metres Angles in Degrees

### Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Junction Conflict Area	451580.00	191530.00	250.00	150.00	1.02	1.03
2	Carriageway	451341.00	191485.86	275.00	87.00	1.50	1.50
3	Crossing Two	451447.00	191564.24	47.00	41.00	1.47	1.46
4	Remote Footpath	451663.80	191617.99	44.82	71.60	1.49	1.49
5	Crossing One	450900.82	191462.00	33.11	41.19	1.44	1.47

### Luminares

#### Luminaire A Data



Supplier	D W Windsor
Type	KIRIUM PRO2 48LED 3k D3 CLO 500mA UM SUG 42 0064 0000 100
Lamp(s)	48 x 3k LED
Lamp Flux (klm)	9.64
File Name	KIRIUM PRO2 48LED 3k D3 CLO 500mA U MSUG 42 0064 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	637.0, 59.7, 0.0
No. in Project	10

#### Luminaire B Data



Supplier	D W Windsor
Type	KIRIUM PRO MINI 16LED 3k A2 CLO 550mA UMSUG 42 0025 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	3.56
File Name	KIRIUM PRO MINI 16LED 3k A2 CLO 550mA A UMSUG 42 0025 0000 100.ies
Maintenance Factor	0.84
Imax70,80,90(cd/klm)	629.3, 57.7, 0.0
No. in Project	1

#### Luminaire C Data



Supplier	D W Windsor
Type	KIRIUM PRO2 64LED 3k C3 CLO 950mA UM SUG 42 0160 0000 100
Lamp(s)	64 x 3k LED
Lamp Flux (klm)	20.54
File Name	KIRIUM PRO2 64LED 3k C3 CLO 950mA U MSUG 42 0160 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	64.8, 8.3, 0.0
No. in Project	13

#### Luminaire D Data



Supplier	D W Windsor
Type	KIRIUM PRO2 48LED 3k A1 CLO 600mA UM SUG 42 0076 0000 100
Lamp(s)	48 x 3k LED
Lamp Flux (klm)	10.87
File Name	KIRIUM PRO2 48LED 3k A1 CLO 600mA U MSUG 42 0076 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	754.9, 211.4, 0.0
No. in Project	1

#### Luminaire E Data

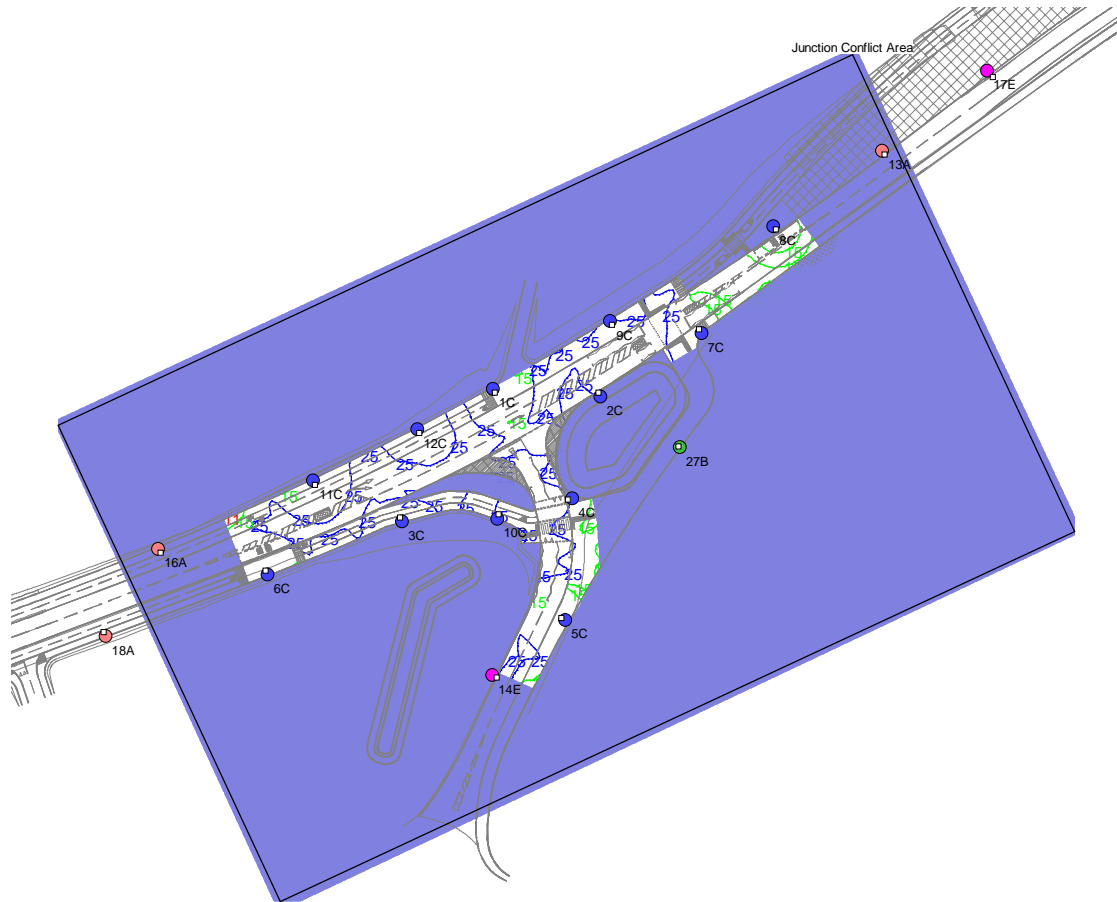
Supplier	
Type	HWD-#3LED4470-M1 Osram Rev 1
Lamp(s)	LED
LampFlux(klm)/Colour	10.26 3000/72
File Name	HWD-#3LED4470-M1-CLO (85w).ldt
Maintenance Factor	0.83
Imax70,80,90(cd/klm)	674.8, 130.6, 0.4
No. in Project	2

## Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	C	451640.53	191676.32	10.00	295.00	0.00	0.00	1.25			
2	C	451671.29	191674.09	10.00	118.00	0.00	0.00	1.25			
3	C	451614.66	191638.42	10.00	115.00	0.00	0.00	1.25			
4	C	451663.20	191645.04	10.00	196.00	0.00	0.00	1.25			
5	C	451661.27	191610.36	10.00	158.00	0.00	0.00	1.25			
6	C	451576.30	191623.32	10.00	112.00	0.00	0.00	1.25			
7	C	451700.05	191692.26	10.00	124.00	0.00	0.00	1.25			
8	C	451720.57	191722.73	10.00	305.00	0.00	0.00	1.25			
9	C	451673.92	191695.70	10.00	301.00	0.00	0.00	1.25			
10	C	451641.91	191639.26	10.00	79.00	0.00	0.00	1.25			
11	C	451589.29	191650.11	10.00	294.00	0.00	0.00	1.25			
12	C	451618.99	191664.76	10.00	299.00	0.00	0.00	1.25			
13	A	451751.60	191744.14	10.00	305.00	0.00	0.00	1.25			
14	E	451640.46	191594.59	10.00	331.00	0.00	0.00	1.40			
15	A	451500.92	191614.13	10.00	299.00	0.00	0.00	1.25			
16	A	451545.15	191630.69	10.00	299.00	0.00	0.00	1.25			
17	E	451781.50	191766.98	10.00	314.00	0.00	0.00	2.40			
18	A	451530.16	191605.83	10.00	115.00	0.00	0.00	1.25			
19	A	451484.87	191588.88	10.00	109.00	0.00	0.00	1.25			
20	A	451424.74	191565.54	10.00	112.00	0.00	0.00	1.25			
21	A	451389.18	191572.26	10.00	299.00	0.00	0.00	1.25			
22	A	451376.33	191538.01	10.00	125.00	0.00	0.00	1.25			
23	A	451465.69	191602.29	10.00	290.00	0.00	0.00	1.25			
24	A	451457.47	191578.52	10.00	109.00	0.00	0.00	1.00			
25	D	450930.94	191486.87	10.00	259.00	0.00	0.00	1.00			
26	C	450904.80	191476.22	10.00	73.00	0.00	0.00	1.25			
27	B	451693.94	191659.63	5.00	144.00	0.00	0.00	0.40			

## Horizontal Illuminance (lux)

Junction Conflict Area

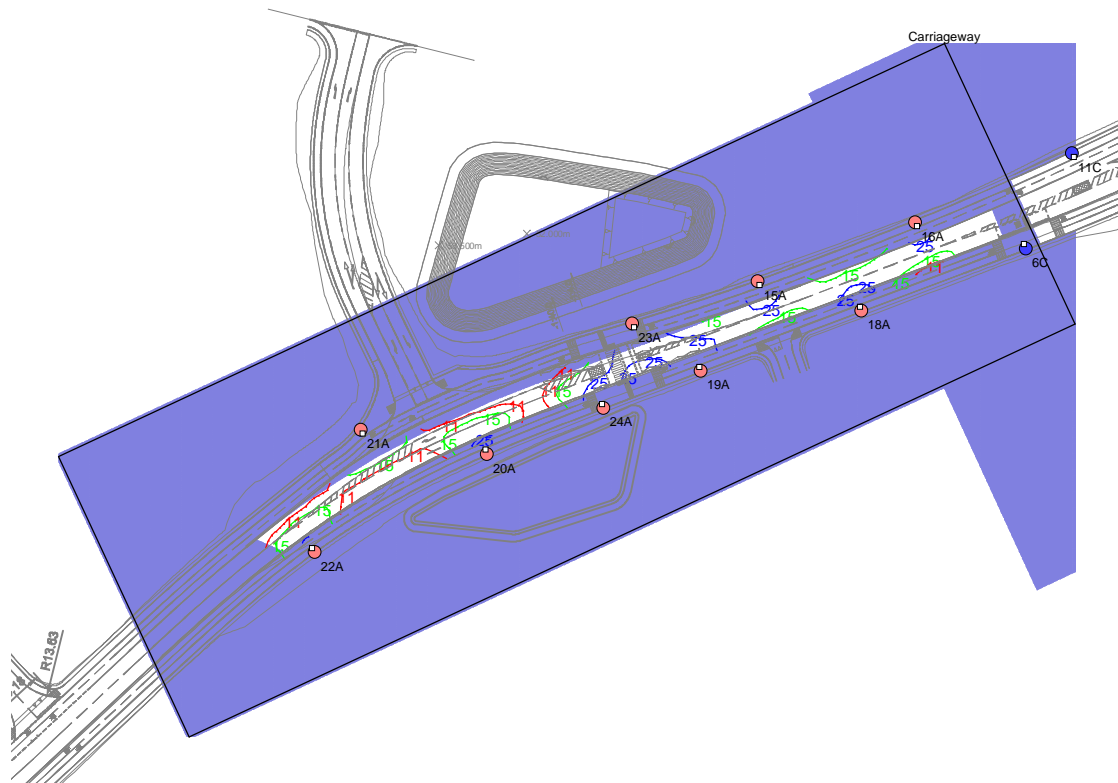


### Results

Eav	23.97
Emin	11.57
Emax	41.41
Emin/Emax	0.28
Emin/Eav	0.48

## Horizontal Illuminance (lux)

Carriageway

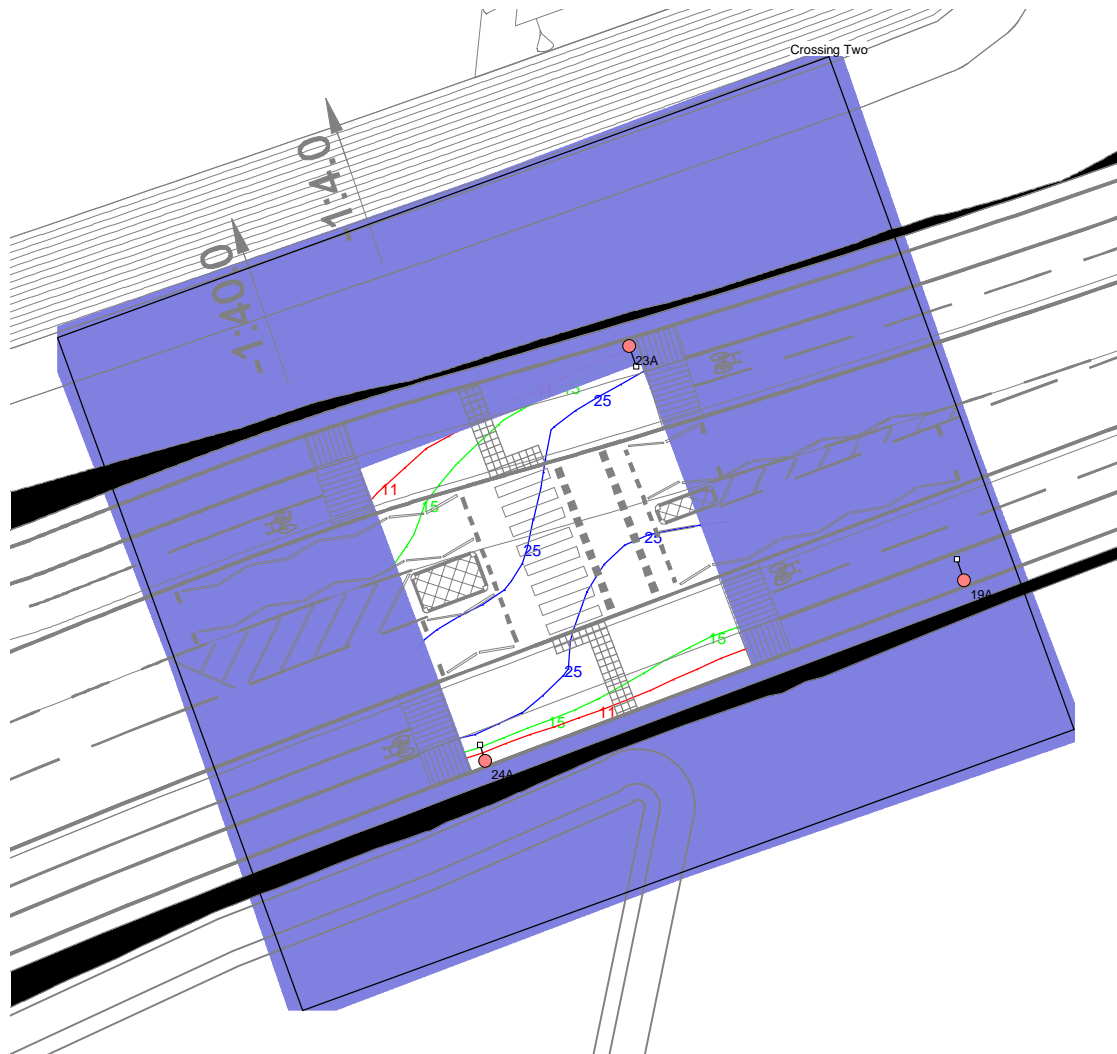


### Results

Eav	17.77
Emin	7.02
Emax	30.91
Emin/Emax	0.23
Emin/Eav	0.40

## Horizontal Illuminance (lux)

Crossing Two

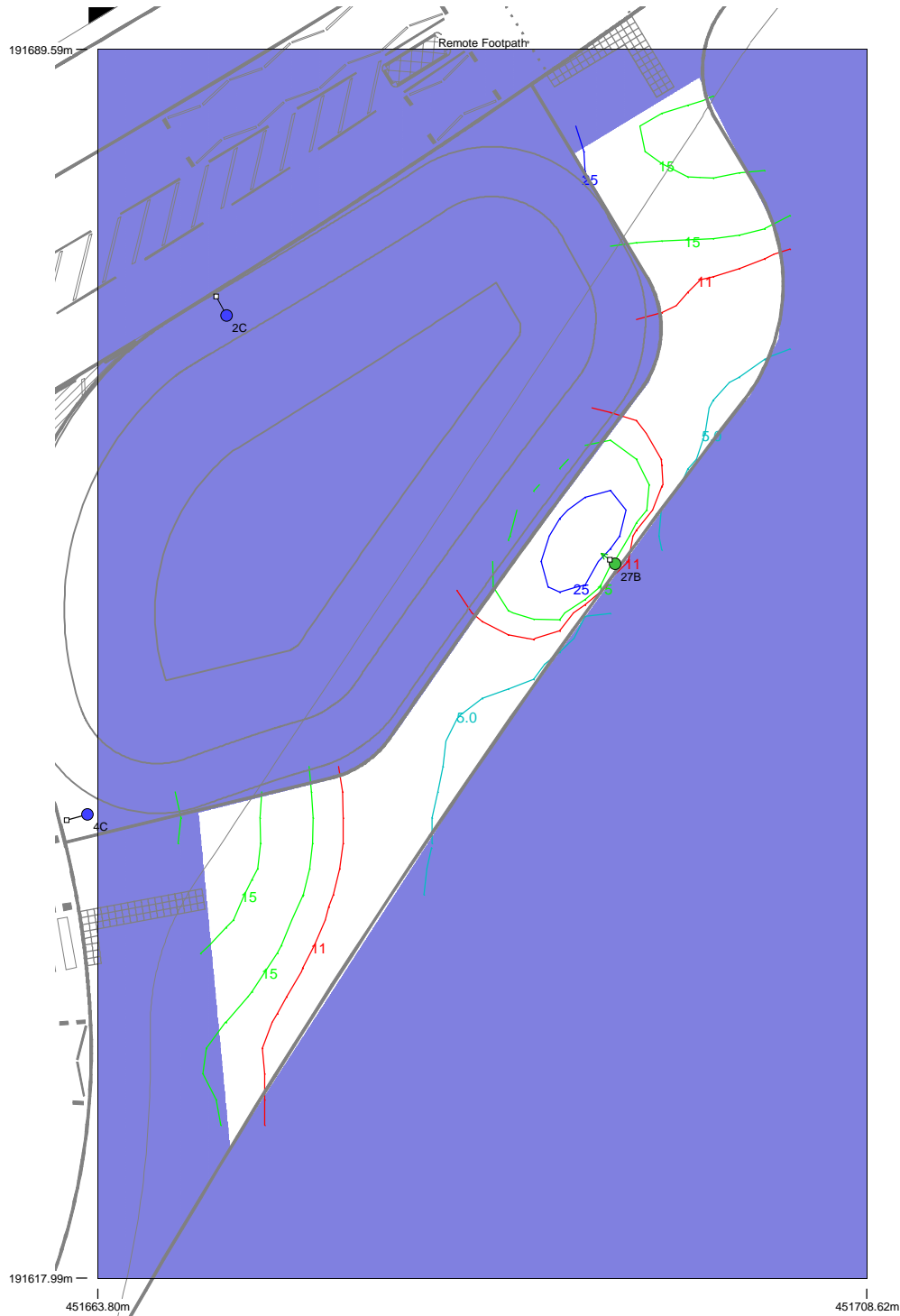


### Results

Eav	21.91
Emin	9.01
Emax	33.01
Emin/Emax	0.27
Emin/Eav	0.41

## Horizontal Illuminance (lux)

Remote Footpath



### Results

Eav	12.80
Emin	3.21
Emax	34.87
Emin/Emax	0.09
Emin/Eav	0.25